

# The consequences of an innovative water quality policy

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presented by Anne Spicer

## Presenter's Notes



It is a privilege to be here tonight– to report back to you on the findings of my study. Thank you all for coming and many thanks to Lakes and Waterways for hosting me.

This evening I am going to talk about cap and trade and the outcomes of the Lake Taupo Nitrogen Trading Programme. I am going to take a bit of time in the middle to explain the methods that I used. I hope you will bear with me because understanding the method helps with understanding the study results. Right at the end I will talk about some of the implications that I think this study has for farming under cap and trade. I hope that you will tell me anything that I have missed that you think is important.

Years ago when I started this thesis I went to a symposium in Wellington about this new policy for water quality – cap and trade. My question to the speaker at the end of their talk was “How will farmers operate under this regime?” A gentleman in the audience jumped up and said that he would answer that question. “Farmers” he said, “are and innovative lot and they will work out how to make this work. They are doing that already up in Taupo”

WOW, I thought – the problem of balancing the needs of the environment with the needs of the agricultural sector is all solved! We just need more cap and trade policy implementations.

So I started reading everything I could find about cap and trade.

#### Cap and Trade – a promising regime

The cap:  
Numeric environmental limits can be achieved  
Farmer choice within limit

The trades:  
Farmers are not 'stuck' in one landuse or farm system  
Encourages uptake of new technology  
Sellers gain capital for investment  
Purchasers increase production or start a new business  
SO: trading minimises the overall cost of change

Indeed, in the literature cap and trade is seen as a promising policy regime for water quality.

Firstly, the cap makes achieving a water quality goal a lot more likely than other regimes – like rule based schemes that tell a farmer how much fertiliser to use and when it can be applied.

The trading arm, allows farmers to change landuse. It encourages them to adopt new technology and so reduce the number of discharge allowances required on their farm. The spare allowances can then be sold and the capital used for more investment. The purchaser can increase their production or a newcomer could start a new business.

So trading minimises the overall cost of change.

And the cap ensures that the environmental goal is reached.

#### Cap and trade for water quality – the evidence

The US:  
No farm level limits – catchment level unworkable  
Very low trading levels – cost of change not minimised  
more scheme design  
no benefit to farmers

New Zealand:  
New studies favour cap and trade  
OVERSEER

So what is the evidence for these claims? – well not a lot.

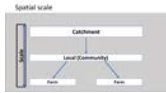
One researcher has counted up 33 water quality cap and trade implementations around the world – most are in the US. None have a limit that applies at the farm level – they all have only Catchment level limits. So for many of them farmer involvement is essentially voluntary. Catchment limits are not being achieved and trading levels are VERY low. Many of these schemes have recorded no trades at all.

Most researchers blame the way the scheme has been designed and/or implemented. Two researchers suggest that there is simply no benefit to farmers so they choose not to take part.

In NZ there are many studies comparing policies. I found nine studies that recommend cap and trade as the way to go. There is a huge difference for New Zealand from the experience of the US and that is OVERSEER. This allows a catchment level limit to be devolved to the farm level – so a limit can be calculated for every farm. This is a game changer.

So I was even more intrigued. I now wanted to look at what the outcomes are of a cap and trade water quality regime in New Zealand – given our very different circumstances – so that meant coming to Taupo.

To look for outcomes is not easy. You don't know up front where outcomes of the cap and trade will occur. So I decided, as much as possible, to look 'everywhere', at 'everything'. And to do that I used three concepts: spatial scale, the influence of history and the entanglement of the biophysical and the social.



So looking at the spatial scale.

If you look at the whole catchment you see land-uses – pasture with sheep and beef, pockets of trees, plantation forest. But this view covers up the details of what is happening on an individual farm – like cropping for winter feed. So a focus on both the Catchment level and the farm level is needed.

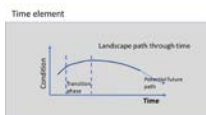
But there is also this intermediate scale – the community level – and this is where patterns emerge. Groups of farms may have reduced stocking levels so patterns of deintensification emerge. With increased stocking rates or a change of stock type a pattern of intensification might show up.

So focusing on the Catchment level shows changes amongst all of the farms together.

Focusing on the community level shows patterns of change amongst groups of farms.

Focusing on the farm level shows what is happening on farm.

And all three views are essential.



Next we have the influence of history but just before we address the time element, I need to explain about why I am using landscape.

When we think of a landscape we tend to think of a picture. But landscape people see a bit more. They tend to see the marks that people have made onto landforms. If you think of a hill with trees planted on it, then lots of things have been done to that landform – someone cleared the original vegetation, someone chose a species of tree, someone chose to plant those trees at that exact place at a particular time. So, the landscape people say, there are stories attached to those trees on a hill – reasons why people chose to do what they did and there is an influence from the landform as well.

So that is why I am using landscape – it describes all the activities on the land and the meaning behind them.

Coming back to the time element - we can track changes in the landscape through time from one transition to another – that's the landscape path.

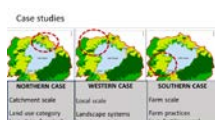
The important point here is a thing called path dependence. The options that are available to you may be limited by what has happened in the past. So to understand the options for the landscape under cap and trade we have to understand how the landscape came about, why it is the way that it is now



Looking at the biophysical and the social:

The biophysical is things like soils, climate, water. And social things are things like decision making, markets, employment. On a farm, the two are so entangled that there is no point in trying to tease them out. So the third aspect of 'looking everywhere for everything' was to include biophysical factors, social factors AND entangled biophysical/social factors.

So now I had to find a way of pulling all of this together. And I chose casestudies with landscape biographies



I had three case studies North, West and South. The East was excluded from the study because it is predominantly plantation forest which is a permitted use.

The case in the north focused on the catchment scale and on land use categories – sheep and beef, dairy, dairy support etc.

The western case focused on the local community scale and on patterns of landscape systems such as tenure change, deintensification and intensification.

The third case focused on farm and included farmer decision making, values, goals, and how these translated into farm practices such as cropping and fertiliser use.

Then I developed a landscape biography for each of the case study areas.



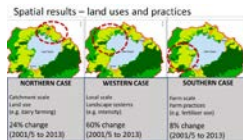
Landscape biographies are stories that talk about the landscape and the reasons why it is the way that it is. They are an amalgamation of individual stories from lots and lots of different sources. Like any biography they start at the beginning of time and follow the changes that occurred over time. My landscape biographies started with pasture development and ended in 2013 when I was interviewing. But they are not just a simple reporting of what people said – because one source of information often challenges the information provided by another source – so there is a lot of arguing back and forth (in my head and with my supervisors) as the biography is written.

The information sources that I used are these:

Farmers, key informants, Environment Court proceedings, WRC Hearings submissions, media reports, consent information (edited by WRC so that I didn't see information that was inappropriate), nitrogen sale information from LTPT (similarly edited), TLC farmer meetings and other records and TDC consent data.

Key informants are people that were associated with the catchment or with Variation 5. So it included councillors, Trust members, valuers, farm consultants, WRC staff.

The thesis examiners commented on what great stories these are and that is due to the very compelling stories that you shared with me – and I thank you all for sharing your stories with me.

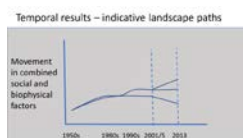


So what were the results of the study?

It won't surprise you to know that - the northern case showed that there had been land use change – some of it a direct result of cap and trade (e.g. conversion to dairy farming) and some of it unrelated (e.g. conversion to dairy support). So looking at land use change over the whole of the study area I found that a moderate amount of land use change had occurred – 24%. Most of this is sheep and beef conversion to forest or dairy.

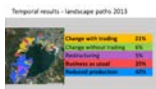
The western case showed that there had been a lot more change than the catchment level figures suggest. There was significant tenure change in this area so then I looked for patterns of change across the whole study area. I found that a massive 60% of the land in the study area had changed. Most of this was deintensification without apparent investment in other on-farm land uses. So sheep and beef farms stayed as sheep and beef (the land use hadn't changed) but the stock units were reduced – in some cases very significantly reduced.

The southern case showed how significant the influence of farmer values and goals are – and when I looked further, this was the case across the whole of the study area. But these values and goals often didn't translate into changes in farm practices – so apart from stock number changes (covered in the second case) there were few changes on farm – only 8% of the land was affected. There were many reasons for this - often historic ones - but one very important factor was the lack of effective mitigations available. By mitigations I mean farm practices that can be changed – like ploughing or fertilising and some of the recent research projects like lucerne and salt licks.



Now turning to the landscape paths.

There were two quite different development paths in the catchment up until 2000 – please don't take the shape of these two lines too seriously – I had a lot of trouble with the drawing tool in this programme. But the point being that these different development paths led to there being a variety of stages of development at the time of benchmarking. Couple this with factors such as drought, a falling carbon market, sheep prices and the new regulations and it is easy to see why these two development paths started to split into multiple paths from around 2000



By 2013, these are the landscape paths that can be seen.

Firstly there is landuse change that has occurred as a result of trading nitrogen. Most of this involves sheep and beef land being converted to dairy or plantation forest. I calculate that 21% of the land in the study area has undergone this kind of change.

Second is landuse change that is unrelated to the regulations – 6% of the study area. Farmers in this category reported that they made the changes because of retirement plans or as part of a long term plan that they were working through for the farm. So these changes would have happened with or without the regulations.

Third there are a small number of farms (5% of the study area) that have chosen to restructure by including product manufacturing within their farm and are looking to develop a brand or provenance. So a farm is no longer just a site of production – it now includes processing of that product and marketing as well.

On around 25% of the land no changes have been made.

On 42% of the land, production has been reduced because of a reduction in stock numbers. Some farmers have semi-retired, others have invested in land outside of the catchment where stock numbers can be increased, others have invested capital outside of farming. Many however (in 2013) hadn't yet invested in other landuses or sources of income

| Key drivers of change   |                          |                     |                 |
|-------------------------|--------------------------|---------------------|-----------------|
| EXTERNAL                | CATCHMENT                | LOCAL               | FARM            |
| Markets                 | Citizen/ science concern | Landcorp exit       | Mitigation      |
| Govt Policy             |                          | C/N markets         | View of N trade |
| Economics of sheep/beef | Climate/habit            | Development legacy  | Capital value   |
|                         | Landuse options          |                     | Farm size       |
|                         | Remote location          | IT Protection Trust | Farmer aims     |
|                         | OVERSEER™                |                     | Kaitiakitanga   |

The other task of the landscape biographies was to indicate what the key drivers of change were.

The main ones are listed here – they are by no means the only ones – just change drivers that I heard about from several interviewees.

I want to pick out just a few and I will discuss them in the conclusion. Crucial drivers, I think, are landuse options, mitigation alternatives, the carbon market, how farmers view the N market, farm sizes and OVERSEER.

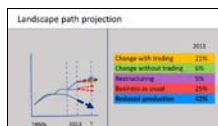
If we apply these landscape drivers to the landscape paths as they were in 2013, then we can guess at the landscape paths that are likely to continue into the future.

Some of the driving forces have ceased. For example, large, relatively cheap areas of land (such as the Landcorp farms) are not likely to come on the market again. So new entrants like those that were attracted to the Catchment by these sales in the 2000s are unlikely to see similar opportunities in the future. The Lake Taupo Protection Trust has achieved its goal and so the major purchaser of allowances to date has withdrawn from the market.

Some driving forces changed – such as the carbon market which fell away (but may come back again).

Other driving forces didn't really eventuate – such as new technologies and alternative landuses. Some – like the remoteness of the Catchment – remain the same.

And new driving forces have emerged – for example Variation six which governs water takes in the Catchment and so could limit future dairy conversions.



Taking these changes into account suggests that the overall trajectory for the catchment is one of reduced production

#### Implications for farming under cap and trade

1. Contribution of N trading - low number of trades
2. Lack of landuse options and mitigation alternatives
3. Small farm sizes, carbon market, water use regulations
4. OVERSEER™
5. Lower production

The investigation of the landscape paths and the drivers of change raised some interesting points about farming in the Catchment. And I would like to share some of these with you.

#### CONTRIBUTION OF N TRADING

There is no doubt that, for some farmers, being able to trade nitrogen between themselves has been a good thing. The (very few) private purchasers talked about how it allowed them to improve their return from the land, particularly land that had too low an NDA for the intended landuse. And the sellers of that NDA talked about the benefits of selling allowances that were surplus to their needs. Sellers to the Lake Taupo Protection Trust talked about the advantages of extracting capital from land that they didn't want to sell (or couldn't sell). As I mentioned before, the capital raised from these sales to the LTPT has been reinvested in

land outside of the catchment,

businesses other than farming,

infrastructure for secondary processing of produce,

increasing the size of a farm size within the Catchment

and in conversion of land in the Catchment to plantation forest – some of it for carbon forest and some as a lifestyle hunting block and carbon investment.

In 2013, however, it appeared that only a minority were reinvesting in the Catchment.

Many farmers talked about their reluctance to trade. Reasons given to me for this are:

1. Place and landscape attachment – people here are very attached to this catchment and many to a pastoral landscape – a tree'd landscape is not favoured, particularly on smaller blocks. But forestry is one of the few low N landuse options. But it looks as though it would be a last resort for many, particularly if carbon prices are low.
2. Effect on land value – there is concern that a lower NDA means a vastly reduced land value and difficulties selling the land. And in 2013 there were stories from real estate agents that lend some support to this view. I tried to investigate this point but was unable to draw any conclusion.
3. Long-term viability – There is a strong view that on farm inflation can only be managed by increasing production per hectare – and to do that surplus NDA is needed – so spare NDA is not surplus – it is a hedge against future inflation
4. 2018 review – uncertainty around the 2018 review and whether NDA values will be lowered made some farmers reluctant to sell

As one farmer commented to me "I would never sell NDA – it is an asset – like breeding stock".

## LACK OF LANDUSE AND MITIGATION OPTIONS

I was constantly surprised by the limited number of options available to farmers and about the limits imposed by this remote highland location – both in terms of land-uses that farms could change to and mitigations that could be applied.

I think that one of the unwritten assumptions of cap and trade is that there are technology choices available. Implementing these, theory suggests, gives sellers and buyers options. What to do then when there are few mitigation alternatives, particularly for sheep and beef? On that, cap and trade is silent.

## EXTERNAL DRIVERS

Another assumption, I believe, is that other markets and regulations can be easily accommodated by a cap and trade regime. But the markets for lifestyle blocks, and carbon and new regulations such as those for water use have a big impact on landuse options. So we need to think of the wider context – the environment within which policies are operating. Particularly the external forces that are operating and how they restrict options.

## OVERSEER

And contributor to the restricted range of options, in my view, is OVERSEER. It is ironic that this model, which is the very reason that the Taupo cap and trade is world renowned, has become a gatekeeper to what farmers can do on their property. While cap and trade claims that farmers have freedom of choice about how to manage their land, in fact they can only do what OVERSEER allows – unless of course they are willing to pay for the required research.

## LOW PRODUCTION

My study suggests that farming in the catchment will continue on a path of lowered production. This scenario really suits the semi-retired and those with investments outside of farming or who are farming outside of the catchment if no restrictions apply there.

Of course, lowered production does not necessarily mean lowered income and there are some entrepreneurs working on developing a rural processing industry and on marketing. And there is at least one farm where the NDA has been concentrated on the best land and intensification has taken place there. But it is also clear that there are barriers to developing more such enterprises. Prime amongst these barriers, I would suggest, is a lack of research and technology policies to support the Taupo cap and trade. We urgently need more landuse options and ways of dealing with nitrogen on-farm.